

What is claimed is:

1. A fusion protein for producing a dual immune response in a vertebrate, which fusion protein comprises:

(a) a first proteinaceous portion analogous to all or part of a peptide endogenously synthesized within the vertebrate, the activity of which peptide is to be inhibited within the vertebrate, and which proteinaceous portion by itself is incapable of eliciting an effective immunoinhibitory response in said vertebrate; connected to

(b) a second proteinaceous portion analogous to all or part of an immunogen from a pathogen, which pathogen is capable of pathogenically infecting the vertebrate;

the portion (b) causing the vertebrate's immune system to recognize the portion (a) and produce a response that:

(i) inhibits the activity of the peptide endogenously synthesized within the vertebrate; and

(ii) protects the vertebrate from infection by the pathogen, when the vertebrate is vaccinated with an effective amount of the fusion protein.

2. A fusion protein according to claim 1 comprising a portion (a) analogous to all or part of a GnRH peptide and a portion (b) analogous to all or part of a BHV-1 antigen.

3. A fusion protein for producing an immune response in a vertebrate, which fusion protein comprises:

(a) a first proteinaceous portion analogous to all or part of a peptide the activity of which is to be inhibited within the vertebrate, and which proteinaceous portion by itself is incapable of eliciting an effective immunoinhibitory response in said vertebrate; connected to

(b) a second proteinaceous portion analogous to all or part of a BHV-1 antigen;

the second proteinaceous portion (b) causing the vertebrate's immune system to recognize the first proteinaceous portion (a) and produce an immune response capable of inhibiting the activity of the peptide within the vertebrate when the vertebrate is vaccinated with an effective amount of the fusion protein.

4. A fusion protein according to claim 3 comprising a portion (a) analogous to all or part of a GnRH peptide.

5. A fusion protein according to claim 3 wherein portion (b) is analogous to all or part of BHV-1 gD.

6. A polynucleotide molecule comprising a nucleotide sequence encoding a fusion protein according to claim 1 or 3.

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7. A vector comprising a polynucleotide molecule according to claim 6.
8. A vector according to claim 7, suitable for *in vitro* expression of the fusion protein.
9. A vector according to claim 7, suitable for *in vivo* expression of the fusion protein.

10. A transformed cell comprising a polynucleotide molecule comprising a nucleotide sequence encoding a fusion protein according to claim 1 or 4.

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11. ~~A dual-function vaccine which comprises a fusion protein according to claim 1, a vector according to claim 7, or a transformed cell according to claim 10 in an amount effective to inhibit the activity of the peptide from which portion (a) of the fusion protein is derived and to protect against infection by the pathogen from which portion (b) of the fusion protein is derived in a vertebrate which endogenously synthesizes the peptide and which can be pathogenically infected by the pathogen, along with a carrier acceptable for pharmaceutical or veterinary use.~~

12. A dual-function vaccine for inhibiting GnRH activity in cattle and for protecting *a* cattle against BHV-1 infection which comprises a fusion protein according to claim 2, *or* *a* vector according to claim 7, ~~or a transformed cell according to claim 10~~ in an amount effective to inhibit GnRH activity and protect cattle against BHV-1 infection, along with a carrier acceptable for pharmaceutical or veterinary use.

13. A vaccine for inhibiting the activity of a peptide in a vertebrate which *a* comprises a fusion protein according to claim 3, *or* *a* vector according to claim 7, ~~or a transformed cell according to claim 10~~ in an amount effective to inhibit the activity of the peptide, along with a carrier acceptable for pharmaceutical or veterinary use.

14. A method for inhibiting the activity of an endogenously-synthesized peptide in a vertebrate and for protecting the vertebrate from a pathogenic infection which comprises immunizing the vertebrate with an amount of a vaccine according to claim 11, which amount is effective to inhibit the activity of the peptide and to protect against infection by the pathogen.

15. A method for inhibiting sexual characteristics in a cow and for protecting the cow against BHV-1 infection which comprises immunizing the cow with an amount of a vaccine according to claim 12, which amount is effective to inhibit sexual characteristics and protect against BHV-1 infection.

16. A method for inhibiting the activity of a peptide in a vertebrate which comprises immunizing the vertebrate with an amount of a vaccine according to claim 13, which amount is effective to inhibit the activity of the peptide.

17. A method for inhibiting sexual characteristics in a vertebrate which comprises immunizing the vertebrate with an amount of a vaccine according to claim 13, wherein the

fusion protein, vector, or transformed cell in said vaccine comprises an amino acid sequence analogous to or encodes an amino acid sequence analogous to all or part of a GnRH peptide, which amount of vaccine is effective to inhibit sexual characteristics.

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